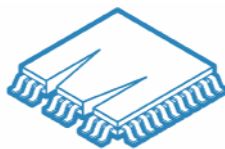
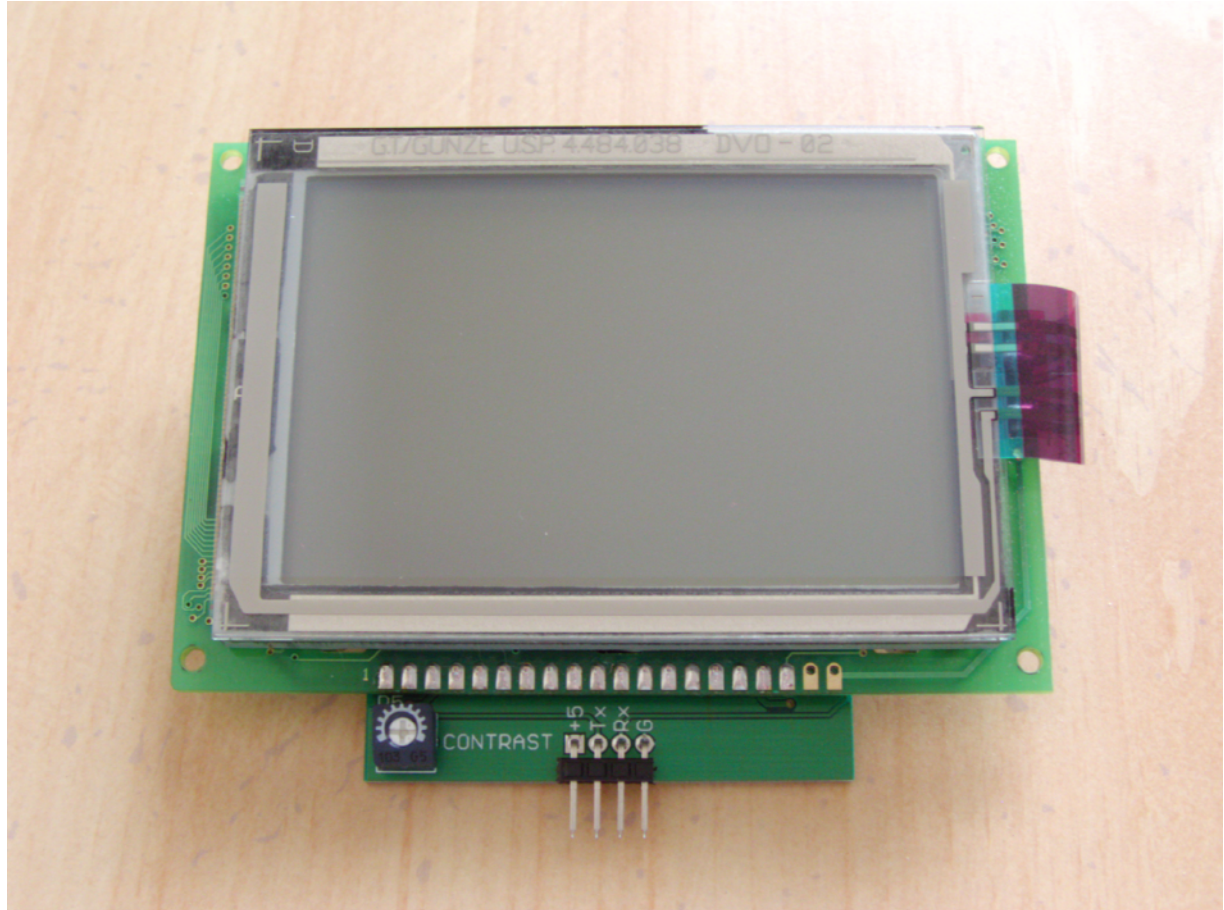


***ez*DISPLAY 2.0**
Serial Graphic LCD Module With Touchscreen



MULTILABS
LAKE FOREST, CALIFORNIA
WWW.MULTILABS.NET
(949) 458-7625

FEATURES

- Easy to use 2 wire 9600 baud TTL level serial interface
- No external components needed
- 160 by 80 resolution
- Integral touchscreen for user feedback
- Graphic and text commands
- True bitmap with no character cells, text can be placed anywhere on the screen
- Integral controller breaks down all LCD and touchscreen functions to simple commands
- Memory to save four screens
- Floating character for visual user feedback
- Built-in ASCII character set font that can be changed by the user
- Memory for 32 user-defined characters
- Characters can be placed in landscape or portrait
- Capabilities to download screens created on a computer
- LED Backlight

DESCRIPTION

The *ezDISPLAY 2.0* is a serial LCD module with an integral touchscreen. The LCD has a resolution of 160 by 80 pixels and can display both graphics and text. The touchscreen is a resistive type screen such as the types used on PDAs and the like. This allows the *ezDISPLAY 2.0* to track the position of the touchscreen down to the pixel. The integral controller breaks down the complex decoding operation of the touchscreen and returns a simple X and Y position. The LCD is also provided with an LED backlight that can be turned on and off with a simple command.

The *ezDISPLAY 2.0* comes with a complete built-in ASCII character set and a generous amount of memory to create 32 user-defined characters. All user-defined characters are stored in non-volatile memory so they are not lost when power is removed. Memory is also provided to store up to 4 screens that can be re-loaded at any time. Again, these saved screens are stored in non-volatile memory. Characters and graphics can be inter-mixed on the screen and characters can be placed in landscape or portrait along with other options. The *ezDISPLAY 2.0* even has a command that allows downloads of screens from other sources such as those drawn on a computer.

The *ezDISPLAY 2.0* comes with a floating character that makes a great companion to the touchscreen. The floating character can be displayed and moved around anywhere on the screen without destroying any of the image on the LCD. This adds another level of character display to the *ezDISPLAY 2.0*. The floating character can either be controlled by the end-use controller or it can be “latched” to the touchscreen so it automatically follows the movement of the user stylus or finger.

The *ezDISPLAY 2.0* comes with four mounting holes for secure placement. A 4-pin header is used to supply power and access the serial data lines.

SPECIFICATIONS

Absolute Maximum Ratings

Note: These are stress ratings only. Stresses above those listed below may cause permanent damage and/or affect device reliability. The operational ratings should be used to determine applicable ranges of operation.

Storage Temperature	-30°C to 80°C
Operating Temperature	0°C to 70°C
Supply Voltage (Vcc)	5VDC
Voltages on Tx and Rx Pins	-0.6VDC to (Vcc +0.6VDC)

Characterisitic	Symbol	Min	Typ	Max	Unit
Supply Voltage	Vcc	4.5	5.0	5.5	V
Supply Current (Backlight Off)	Icc	-	13	-	mA
Supply Current (Backlight On)	Icc	-	132	-	mA

OPERATION BASICS

Care of Touchscreen

Before we get started here are some handling and operational guidelines that should be observed for the touchscreen. Failure to follow these guidelines may cause permanent damage to the touchscreen:

1. Prevent any liquids from coming into contact with the touchscreen. The upper electrode film and lower electrode glass are fixed with adhesive and have vent holes between them. Liquids may penetrate easily due to its structure. A housing designed to prevent penetration would be required if used in a damp or moist environment.
2. Do not stack or place anything on top of the touchscreen. This may scratch the surface or cause a deformation to occur.
3. Wipe off any dirt on the touchscreen with a dried flexible cloth. Moist cloths and cleaning solutions should be avoided (see item 1).
4. Use a finger, polyacetal pen (a stylus such as those used on PDAs), or other smooth objects on the touchscreen. The surface of the touchscreen may be damaged if a ball-point pen, metal pieces, sharp objects, rough objects, etc. are used.
5. Do not expose the touchscreen to direct sunlight for long periods of time. Polyester film is used on the touchscreen and exposure to direct sunlight for long periods of time may cause discoloration.

Connections

The SIP pins are marked on the unit to indicate the proper connections. The connections are as follows when looking at them from left to right:

Pin 1 – +5VDC Input supply

Pin 2 – TTL Serial data from the ezDISPLAY 2.0 module (Tx)

Pin 3 – TTL Serial data to the ezDISPLAY 2.0 module (Rx)

Pin 4 – Supply ground

Built-in Character Set

The ezDISPLAY 2.0 module comes with a standard ASCII character set of 96 characters. These characters follow the standard ASCII codes values from 32 to 127. Below is a table of the characters and their codes. For the bitmapped images of each character please visit our website at www.multilabs.net:

Character	Code	Character	Code	Character	Code	Character	Code
Space	32	8	56	P	80	h	104
!	33	9	57	Q	81	i	105
“	34	:	58	R	82	j	106
#	35	;	59	S	83	k	107
\$	36	<	60	T	84	l	108
%	37	=	61	U	85	m	109
&	38	>	62	V	86	n	110
‘	39	?	63	W	87	o	111
(	40	@	64	X	88	p	112
)	41	A	65	Y	89	q	113
*	42	B	66	Z	90	r	114
+	43	C	67	[	91	s	115
,	44	D	68	\	92	t	116
-	45	E	69	]	93	u	117
.	46	F	70	^	94	v	118
/	47	G	71	_	95	w	119
0	48	H	72	`	96	x	120
1	49	I	73	a	97	y	121
2	50	J	74	b	98	z	122
3	51	K	75	c	99	{	123
4	52	L	76	d	100	|	124
5	53	M	77	e	101	}	125
6	54	N	78	f	102	~	126
7	55	O	79	g	103		127

**All code values are in decimal*

LCD Screen Layout

The ezDISPLAY 2.0 is setup as a true bitmap with no character cells or restrictions where anything can be placed. This means that all the drawing and text commands require an X,Y coordinate to tell the ezDISPLAY 2.0 where to draw. The resolution of the ezDISPLAY 2.0 is 160 by 80 and is setup as follows:

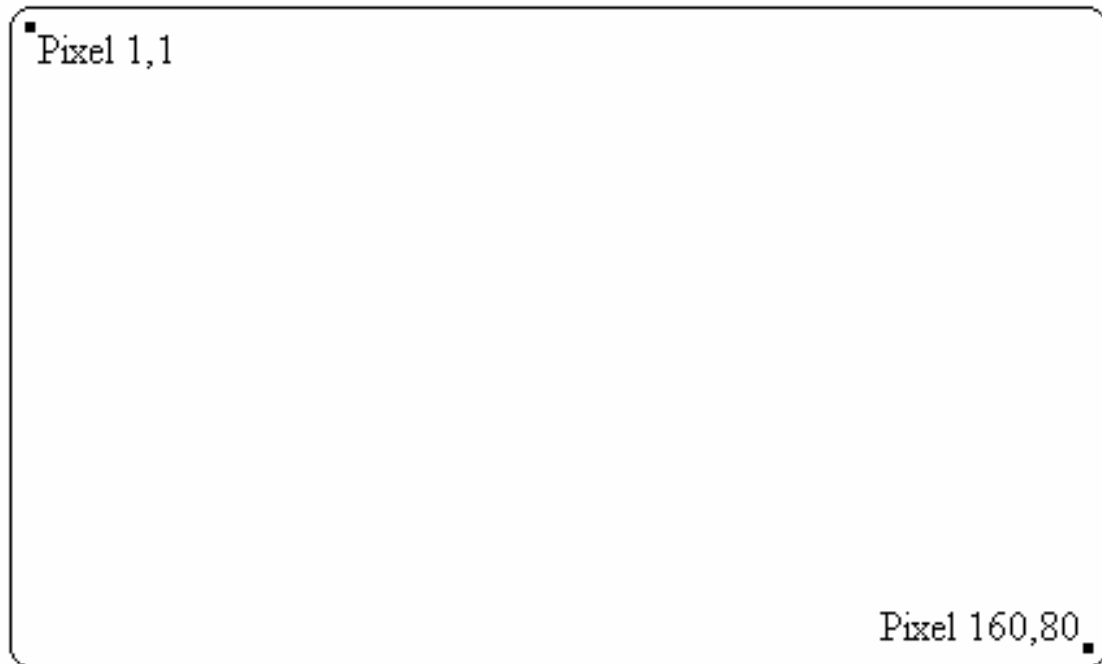


Figure 1

Figure 1 shows the furthestmost pixel locations. The upper most left-hand pixel has a coordinate of 1,1 and the lower most right-hand pixel has a coordinate of 160,80. The X direction goes across the screen and has a value of 1 to 160 starting from the left-hand side. The Y direction goes from the top to the bottom of the screen and has a value of 1 to 80 starting at the top.

Touchscreen Calibration

All resistive touchscreens need to go through a “calibration” when they are fitted to an LCD. This process ensures that the touchscreen data is decoded correctly for a proper screen mapping. The ideal is to have the touchscreen decoded so that it matches the LCD screen pixel for pixel. Your ezDISPLAY 2.0 comes pre-calibrated from the factory and more than likely another calibration will not be needed. However, if you find that the data from the touchscreen is grossly out-of-range then you can re-calibrate the touchscreen at any time. This is discussed in more detail in the “Commands” section of this manual. A good test to perform to check for calibration accuracy is to latch the floating character to the touchscreen. How to do this is also discussed in the “Commands” section of this manual. Once this is done use a fine-tipped stylus and move it around the entire touchscreen. The upper left-hand pixel of the floating character should closely follow where the stylus is touching.

There are many factors that can affect the calibration of the touchscreen. Some common ones are voltage supplied and temperature. For example, if the touchscreen is calibrated with a +5VDC supply at room temperature (about 25°C) and then used in a very warm room (40°C) the calibration will be off since the properties of the touchscreen will have changed with such a great temperature rise. Also, if the supply voltage is under or above the voltage it was calibrated at this will affect calibration as well. If the touchscreen was calibrated at +5VDC and then the ezDISPLAY 2.0 is operated at +4.8VDC then the calibration will be off. For a good calibration

the floating character should be within ± 1 or 2 pixels of the stylus. Again, for the most part, if the ezDISPLAY 2.0 is used in normal room temperatures and a well regulated +5VDC supply is used then recalibration should never be needed. If the ezDISPLAY 2.0 is going to be used in a different type of environment then it should be re-calibrated within that environment. **IMPORTANT – It is also recommended that a fine-point stylus be used for calibration. Using a device with a broad point or a finger will result in an inaccurate calibration.**

Communications Protocol

Communications are done through the TTL level Tx and Rx asynchronous data lines. The protocol is 9600 baud with 8 data bits, 1 stop bit, and no parity. The amount of data sent to the ezDISPLAY 2.0 is dependant on the command. Data is sent to the ezDISPLAY 2.0 one byte right after another with no delay. Once the proper amount of data has been received by the ezDISPLAY 2.0 it will be analyzed and executed and either an ACK (decimal value of 6) or NAK (decimal value of 21) will be returned. The only exception to this is when the command for reading the touchscreen is sent. Instead of an ACK being sent the ezDISPLAY 2.0 will send two bytes of data. Refer to the “Commands” section in this manual for information on the data that is sent. The ezDISPLAY 2.0 will NAK a command if one of the values is out of range or a command code is not recognized. For the amount of time it takes for the ezDISPLAY 2.0 to send a NAK see the “Timing” section in this manual. If the command code is recognized and all the values are within range then the command will be executed and an ACK will be sent once completed. Again, for the amount of time it takes for the ezDISPLAY 2.0 to send an ACK see the “Timing” section in this manual. Another command should not be sent to the ezDISPLAY 2.0 until the ACK is received. Sending another command before the ACK is received might result in unexpected or incorrect operation.

Timing

When the last byte of a command is sent to the ezDISPLAY 2.0 an ACK or NAK will be returned as discussed in the “Communications Protocol” section. The only exception to this is when the command for reading the touchscreen is sent. Instead of an ACK being sent the ezDISPLAY 2.0 will send two bytes of data. Refer to the “Commands” section in this manual for information on the data that is sent. The following is a timing diagram (Figure 2) followed by the timing values of the ezDISPLAY 2.0. Figure 1 is valid for all timing values except for startup which is typically 91mS.

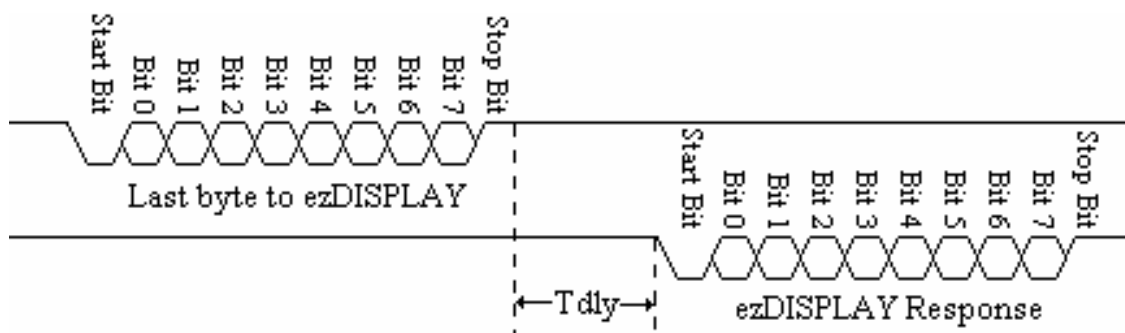


Figure 2

Values for Tdly -

Sends an NAK (Received either an invalid command code or a value is out of range):

Typically 1 μ S

Received last byte of Add Character command until an ACK is sent:

Typically 42.3mS

Received last byte of Character Placement command until an ACK is sent:

Typically 6.8mS

Received last byte of Download Screen data until an ACK is sent:

Typically 1 μ S

Received last byte of Erase Area command until an ACK is sent:

Erase Area

Minimum 258 μ S & Maximum 875mS

Whole Screen

Typically 27mS

Received last byte of Floating Character command until an ACK is sent:

User Control

Typically 7.9mS

Follow Touchscreen (Latch to Touchscreen)

50 μ S

Received last byte of Get Touchscreen Data command until the first byte is sent:

Typically 558 μ S

Receive last byte of Line command until an ACK is sent:

Minimum 150 μ S & Maximum 10.8mS

Receive last byte of Pixel command until ACK is sent:

Typically 126 μ S

Received last byte of Retrieve Screen command until ACK is sent:

Typically 388mS

Received last byte of Save Screen command until ACK is sent:

Typically 9S

Received last byte of Touchscreen Calibration command until ACK is sent:

No set time is defined since it is based on the user

Received last byte of Backlight command until ACK is sent:

10 μ S

Contrast Adjustment

At the front of the module on the left-hand side there is a small knob labeled “CONTRAST”. This allows you to adjust the contrast of the LCD screen to best suit your operating conditions. Rotate the knob clockwise and counter-clockwise until the pixels that are on are clear and the pixels that are off are not visible.

OPERATION COMMANDS

Add Character

This command allows you to define your own custom characters. The character memory map is setup to allow 128 total characters. Characters 0 through 31 are undefined and 32 through 127 are pre-defined from the factory to a standard ASCII character. Even though this command will allow you to define custom characters from 0 to 31 you can also change characters 32 through 127. This allows you to define custom fonts or replace ASCII characters that will not be used with custom characters. In any case each character is 8 by 8 pixels:

128	64	32	16	8	4	2	1

Figure 3

To create a customer character you first draw the image that you want in the 8 by 8 matrix. Once you have what you want you have to determine a value for each of the eight rows. At the bottom of each column there is a number starting at 128 under the left-most column. These numbers represent the value of each pixel that is turned on in that row. To get the byte value for a row you add up all the values for each pixel that is turned on. For example:

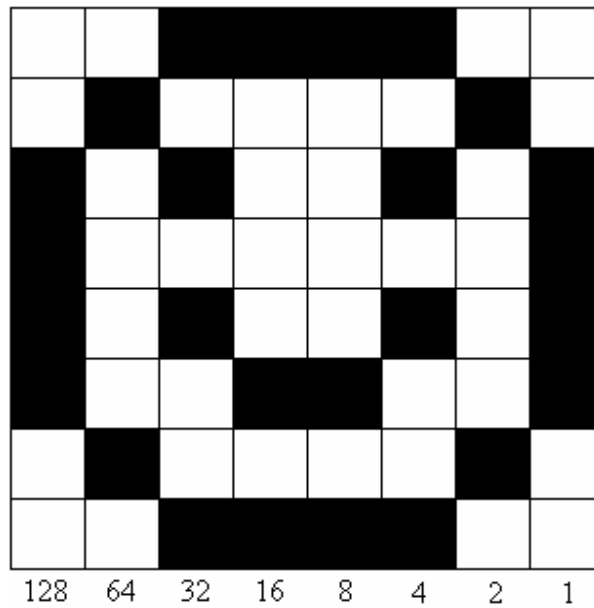


Figure 4

This custom character would be defined by the follow values: 60, 66, 165, 129, 165, 153, 66, and 60. Data is sent to the ezDISPLAY 2.0 from the top row to the bottom row.

Syntax: code, character #, byte 0, byte 1, byte 2, byte 3, byte 4, byte 5, byte 6, byte 7

- **Code** is the character that tells the ezDISPLAY 2.0 that this is an Add Character command. This code is an “A” (decimal value of 65).
- **Character #** is a value from 0 to 127 that tells the ezDISPLAY 2.0 which character to define.
- **Bytes 0 – 7** are the eight bytes that make up the character bitmap. They are sent to the ezDISPLAY 2.0 from the top byte to the bottom byte.

Backlight

This command allows you to turn the LED backlight on and off.

Syntax: code, mode

- **Code** is the character that tells the *ezDISPLAY* 2.0 that this is a Backlight command. This code is a “B” (decimal value of 66).
- **Mode** tells the *ezDISPLAY* 2.0 what to do with the backlight:
 - 0 – Off
 - 1 – On

Character Placement

This command places a character (either built-in or user-defined) on the screen. The character can be placed in a variety of different ways depending on your needs. The first option is the character can be placed in either landscape or portrait. Figure 5 shows an “A” in landscape and figure 6 shows an “A” in portrait.

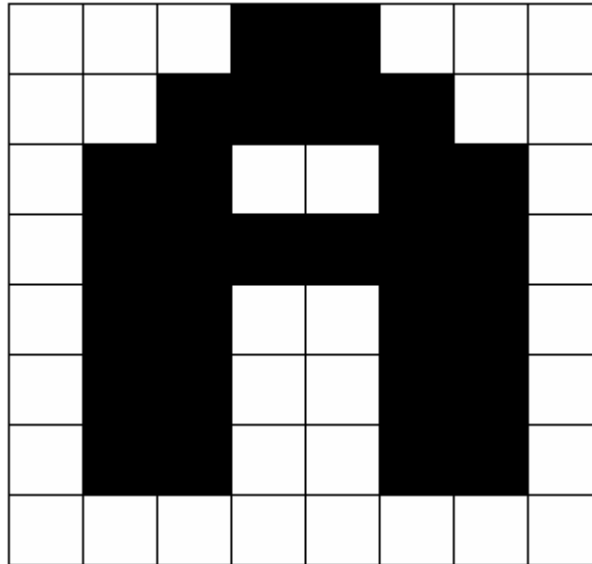


Figure 5

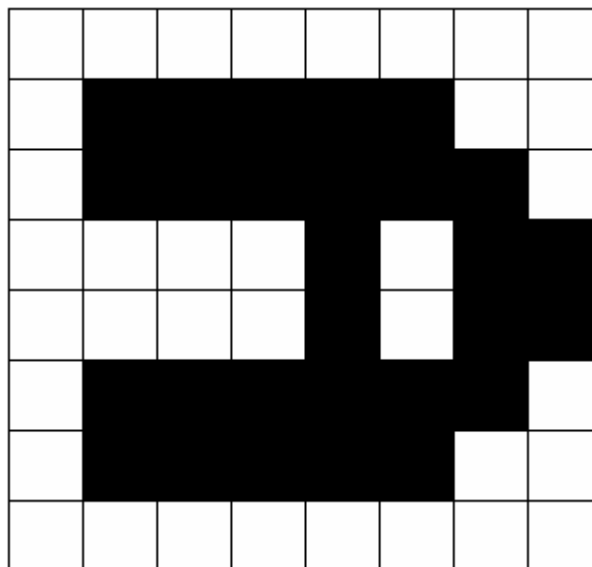


Figure 6

Whether in landscape or portrait a character can be placed in regular mode as shown in the previous figures or in reverse mode as shown in Figure 7.

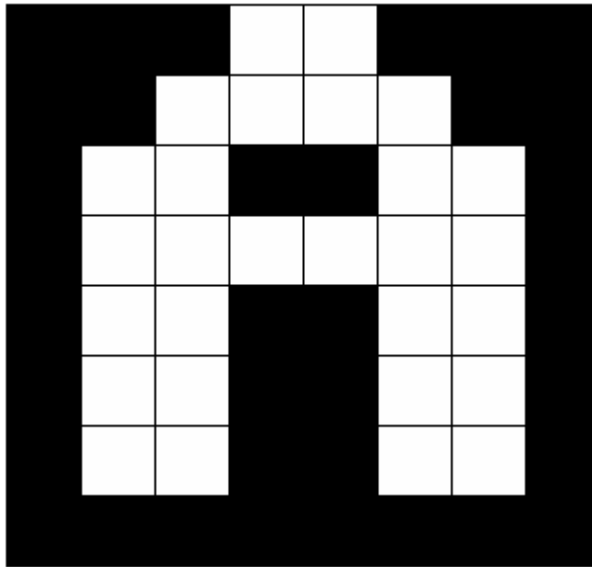


Figure 7

A character can also be placed as an opaque or as a transparent. When a character is placed as an opaque all the pixels are drawn. The pixels that are off are turned off and the pixels that are on are turned on. When drawn this way a character will completely overwrite whatever it is placed over. When a character is placed as a transparent then the pixels that are off are not drawn. Only the pixels that are on are drawn. This allows you to place a character over a background and the background will be visible through the off pixels of the character. Regardless of the options all characters are placed as a true bitmap. The ezDISPLAY 2.0 has no character cells, any character can be placed anywhere on the screen. When placing a character you give the ezDISPLAY 2.0 an X and Y coordinate. This coordinate is the starting position of where the character will be drawn. This coordinate represents the upper left-hand pixel of the character being placed whether landscape or portrait.

Syntax: code, mode, character #, x, y

- **Code** is the character that tells the ezDISPLAY 2.0 that this is a Character Placement command. This code is a "C" (decimal value of 67).
- **Mode** tells the ezDISPLAY 2.0 how to place the character. There are eight modes:
 - 0 – Landscape, Regular, Opaque
 - 1 – Landscape, Regular, Transparent
 - 2 – Landscape, Reverse, Opaque
 - 3 – Landscape, Reverse, Transparent
 - 4 – Portrait, Regular, Opaque
 - 5 – Portrait, Regular, Transparent
 - 6 – Portrait, Reverse, Opaque
 - 7 – Portrait, Reverse, Transparent
- **Character #** is a value from 0 to 127 that tells the ezDISPLAY 2.0 which character to display.
- **X** is a value from 1 to 160 that indicates the starting x position on the screen.
- **Y** is a value from 1 to 80 that indicates the starting y position on the screen.

Download Screen

This command allows the ezDISPLAY 2.0 to except screen data from an outside source. The screen data is in the form of a continuous stream of 1600 bytes. The bitmap of the ezDISPLAY 2.0 is laid out as 80 rows of 20 bytes as shown in Figure 8:

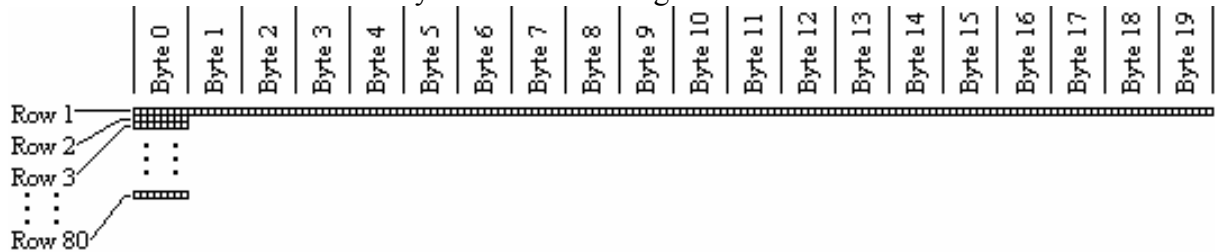


Figure 8

Byte 0 of row 1 represents the upper most left-hand byte of the screen and is the starting position for the data stream. The first byte of the data stream is placed there and the second byte is placed at byte 1 of row 1. The bytes are continually placed next to each other down the row. When byte 19 of row 1 has been placed then the next byte is placed in position byte 0 of row 2. Row 2 is filled left to right and then row 3 all the way until Byte 19 of Row 80 which is the 1600th and last byte of the data stream. The screen is drawn as the data is received so anything current on the screen will be erased. This command will also automatically turn off the floating character if it is on.

Syntax: code, bytes 0 - 1599

- **Code** is the character that tells the ezDISPLAY 2.0 that this is a Download Screen command. This code is a “D” (decimal value of 68).
- **Bytes 0 - 1599** are the bytes that make up the screen data. They are sent to the ezDISPLAY 2.0 from the upper left-hand byte to the lower right-hand byte.

Erase Area

This command is used to either erase a portion or the entire screen. When an area is erased all the pixels in that area are turned off. In the case of erasing the entire screen the whole screen is cleared. When the entire screen is erased the *ezDISPLAY 2.0* will automatically turn off the floating character if it is on. The floating character is not affected for an area erasure. The area to be erased is defined by two coordinates that make up a square/rectangular area. The upper left-hand corner of the area is defined as X1,Y1 and the lower right-hand corner is defined as X2,Y2.

Area

Syntax: code, mode, x1, y1, x2, y2

- **Code** is the character that tells the *ezDISPLAY 2.0* that this is an Erase Area command. This code is an “E” (decimal value of 69).
- **Mode** is 0 and tells the *ezDISPLAY 2.0* just to erase an area and not the whole screen.
- **X1** is a value from 1 to 160 that indicates the starting x position on the screen.
- **Y1** is a value from 1 to 80 that indicates the starting y position on the screen.
- **X2** is a value from 1 to 160 that indicates the ending x position on the screen
- **Y2** is a value from 1 to 80 that indicates the ending y position on the screen.

Whole Screen

Syntax: code, mode

- **Code** is the character that tells the *ezDISPLAY 2.0* that this is an Erase Area command. This code is an “E” (decimal value of 69).
- **Mode** is 1 and tells the *ezDISPLAY 2.0* to erase the whole screen.

Floating Character

This command enables you to draw a character that will “float” over the other characters and graphics on the screen without erasing or disturbing them. This character is special in that it can be changed on-the-fly with a single command. To move this character or change its appearance it is not necessary to clear it first, the *ezDISPLAY 2.0* takes care of this for you. Just send the new information and the floating character will be removed from its old position and drawn in the new position automatically.

The floating character has another special feature. It can either be controlled by the user or it can be “latched” to the touchscreen and automatically controlled by the *ezDISPLAY 2.0*. When a floating character is latched to the touchscreen it will become visible when the touchscreen is pressed and removed when the screen is not being pressed. While the touchscreen is being pressed the floating character position is automatically updated without any intervention. The floating character will follow the stylus/finger around the screen. This makes a great visual indicator without any work on your part.

Regardless of the mode, user controller or “latched”, the floating character will automatically be turned off when any of the following commands are executed: Erase Area (only when the whole screen is erased, an area erasure **does not** affect the floating character), Retrieve Screen, Download Screen, and Touchscreen Calibration. After these commands are executed the floating character will have to be turned back on if needed.

User Controlled

Syntax: code, mode, character #, x, y

- **Code** is the character that tells the *ezDISPLAY 2.0* that this is a Floating Character command. This code is an “F” (decimal value of 70).
- **Mode** tells the *ezDISPLAY 2.0* how to work with the character:
0 – Off
1 – On and under user control
- **Character #** is a value from 0 to 127 that tells the *ezDISPLAY 2.0* which character to use.
- **X** is a value from 1 to 160 that indicates the starting x position on the screen.
- **Y** is a value from 1 to 80 that indicates the starting y position on the screen.

“Latched” to Touchscreen

Syntax: code, mode, character #

- **Code** is the character that tells the *ezDISPLAY 2.0* that this is a Floating Character command. This code is an “F” (decimal value of 70).
- **Mode** tells the *ezDISPLAY 2.0* how to work with the character:
2 – Off
3 – On and under touchscreen control
- **Character #** is a value from 0 to 127 that tells the *ezDISPLAY 2.0* which character to use.

Get Touchscreen Data

Executing this command makes the *ezDISPLAY 2.0* transmit the current X and Y touch position of the touchscreen. The touchscreen is automatically read approximately 10 times a second. Each time the *ezDISPLAY 2.0* performs a touchscreen read the X and Y coordinate of the current touch position is stored in memory. There is no buffer so the data is erased and updated on each automatic read. The data is stored as a pixel position value. The X coordinate will have a value of 1 to 160 and the Y coordinate will have a value of 1 to 80. The accuracy of this data depends on the object pressing the touchscreen. For example, a fine-point stylus will be more accurate than a finger press. When a finger presses the touchscreen the touchscreen read will read toward the center of mass. This varies depending on the finger used, the force of the press, how the finger is placed on the touchscreen, ect. The accuracy you need depends on your application. For example, if drawing virtual buttons on the screen for a user to press then they should be made big enough to accompany a wide range of finger sizes and press forces.

When this command is executed you will receive two bytes from the *ezDISPLAY 2.0*. The first is the X coordinate (value of 1 to 160) and then the Y coordinate (value of 1 to 80). If you receive a 0,0 this indicates that the touchscreen is not currently being pressed.

Syntax: code

- **Code** is the character that tells the *ezDISPLAY 2.0* that this is a Get Touchscreen Data command. This code is a “G” (decimal value of 71).

Line

This command allows you to draw straight lines either horizontally or vertically. When drawing horizontally both the Y1 and Y2 values must match. When drawing vertically both the X1 and X2 values must match. Lines can be drawn both on (visible) and off for erasing a line.

Syntax: code, mode, x1, y1, x2, y2

- **Code** is the character that tells the ezDISPLAY 2.0 that this is a Line command. This code is an "L" (decimal value of 76).
- **Mode** tells the ezDISPLAY 2.0 how to draw the line:
 - 0 – Off
 - 1 – On
- **X1** is a value from 1 to 160 that indicates the starting x position on the screen.
- **Y1** is a value from 1 to 80 that indicates the starting y position on the screen.
- **X2** is a value from 1 to 160 that indicates the ending x position on the screen
- **Y2** is a value from 1 to 80 that indicates the ending y position on the screen.

Pixel

This command allows you to control individual pixels on the screen. A pixel can either be turned on or off.

Syntax: code, mode, x, y

- **Code** is the character that tells the ezDISPLAY 2.0 that this is a Pixel command. This code is a “P” (decimal value of 80).
- **Mode** tells the ezDISPLAY 2.0 how to draw the pixel:
 - 0 – Off
 - 1 – On
- **X** is a value from 1 to 160 that indicates the x coordinate on the screen.
- **Y** is a value from 1 to 80 that indicates the y coordinate on the screen.

Retrieve Screen

This command allows you to load one of the four saved screens in the non-volatile memory to the LCD screen. When this command is executed the entire screen is redrawn and all data on the current screen will be lost. This command will also automatically turn off the floating character if it is on.

Syntax: code, screen #

- **Code** is the character that tells the ezDISPLAY 2.0 that this is a Retrieve Screen command. This code is an “R” (decimal value of 82).
- **Screen #** tells the ezDISPLAY 2.0 which screen to load and can be a value of 0 to 3.

Save Screen

This command allows you to save the current LCD screen to one of the four screen pages in the non-volatile memory.

Syntax: code, screen #

- **Code** is the character that tells the *ezDISPLAY* 2.0 that this is a Save Screen command. This code is an “S” (decimal value of 83).
- **Screen #** tells the *ezDISPLAY* 2.0 which screen page to save to and can be a value of 0 to 3.

Touchscreen Calibration

The touchscreen comes pre-calibrated from the factory so you will probably never need this command. However, if you find the reported touchscreen positions grossly inaccurate or the ezDISPLAY 2.0 is going to be used in an extreme environment you can use this command to re-calibrate the touchscreen. The calibration data is stored in non-volatile memory and is automatically loaded when power is applied.

When you send the command to the ezDISPLAY 2.0 to enter calibration mode the entire screen is cleared, the floating character is turned off (if on), and the automatic touchscreen readings are suspended. Since the screen is cleared during this command all screen data will be lost. It should be saved to one of the screen memory pages if you need to get it back. **IMPORTANT – It is recommended that a fine-point stylus be used for calibration. Using a device with a broad point or a finger will result in an inaccurate calibration.**

Once the screen is cleared a single pixel will be turned on in the upper left-hand corner as shown in the following figure:

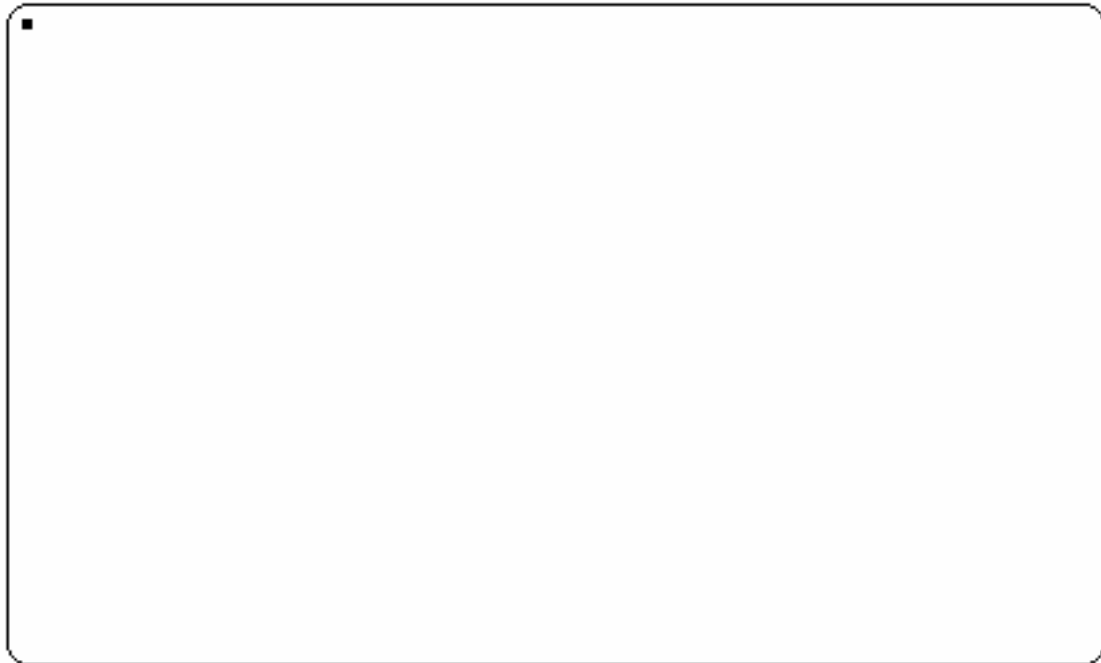


Figure 9

Press down on this point with your stylus. The pixel will be cleared and when you lift your stylus off of the touchscreen a pixel in the lower right-hand corner will be drawn:



Figure 10

Press down on this point with your stylus. The pixel will be cleared and the *ezDISPLAY 2.0* will calculate the calibration values. If successful the *ezDISPLAY 2.0* will send an ACK (decimal value of 6). If the calibration could not be done then the *ezDISPLAY 2.0* will send a NAK (decimal value of 21). If this is the case then resend the calibration command and do it again. Once done, a good test to perform to check for calibration accuracy is to latch the floating character to the touchscreen. How to do this is also discussed in the “Commands” section of this manual. Once this is done use a fine-tipped stylus and move it around the entire touchscreen. The upper left-hand pixel of the floating character should closely follow where the stylus is touching.

Syntax: code

- **Code** is the character that tells the *ezDISPLAY 2.0* that this is a Touchscreen Calibration command. This code is a “T” (decimal value of 84).

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